



NUTRITION

Feeding Cats With Chronic Kidney Disease: Customizing the Nutritional Management Plan

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The approach to nutritional management of chronic kidney disease (CKD) in cats has changed significantly over the past 2 decades. In the past, cats typically were diagnosed as having late-stage kidney “failure,” or what would now be classified as International Renal Interest Society (IRIS; iris-kidney.com) later stage 3 or stage 4, when clinical signs such as anorexia, lethargy, and weight loss raised concerns on the part of the cat owner. After diagnosis, veterinarians prescribed one of a limited number of reduced-protein therapeutic renal diets that inappetent or ill patients often refused. The clinical picture tended to deteriorate quickly, resulting in poor quality of life for the patient and anxiety for the owner.

Today the outlook is significantly improved for both cats and owners. Proactive preventive care, monitoring, and screening, coupled with heightened awareness of feline CKD prevalence, have enabled veterinarians to diagnose CKD earlier—frequently in IRIS stages 1 and 2, before cats have begun to demonstrate clinical signs of disease. This, in turn, has facilitated early nutritional intervention and a stepwise approach to CKD management. With diligent monitoring and individualized management, there is opportunity not only to slow the disease progression but to sustain a good quality of life for many years.

This article, the second in a 2-part series on feline CKD,¹ addresses nutritional intervention, which is the cornerstone for maintaining health and quality of life for cats with CKD. Rather than resorting to the one-size-fits-all dietary approaches of the past, veterinarians today can manage patients as the unique individuals they are when making nutritional recommendations. Overall, the goals of nutritional management of CKD are as follows:² (1) improve or prevent consequences of CKD and uremia; (2) slow progression and/or prolong survival; (3) minimize imbalances of electrolyte, mineral, and acid-base balance; and (4) maintain adequate nutrition.

NUTRITIONAL ASSESSMENT FOLLOWING CKD DIAGNOSIS

After patient diagnosis and staging, veterinarians should complete a nutrition assessment.³ Steps include the following:

- **Thorough diet history, including current diet and intake.** What is the cat currently eating (**TABLE 1**), including treats and food used to give medication? Has appetite or intake changed? Is the cat eating enough of its current diet to assure sufficient consumption of specific nutrients and calories?

- **Complete physical exam, including body weight and body (BCS) and muscle condition scores (MCS).** Is the patient's BCS ideal, underweight, or overweight? Has the cat lost weight or remained weight-stable since its last exam? Does the MCS assessment reveal mild, age-related sarcopenia or has muscle loss accelerated?
- **Hydration status.** Is the cat dehydrated? Have changes in urine output been noted?
- **Comorbidities.** Does the patient have a concurrent condition, such as hyperthyroidism, hypertension, obesity, or impaired gastrointestinal function?

Assessing the nutritional status, the stage of disease, and the patient's overall state of health can help guide the veterinarian's nutritional recommendation to meet the needs of the individual cat.

When conducting a nutritional assessment, it is important to gain a comprehensive understanding of everything the cat is eating daily, while also analyzing the nutritional profile of the diet.

A STEP-WISE APPROACH TO NUTRITIONAL MANAGEMENT

The advent of new strategies to diagnose CKD earlier also makes it possible to intervene earlier with

nutrition. However, clinical research is less clear regarding when or what nutritional therapy should be implemented in early stages of CKD. Few nutrients aside from phosphorus have been studied in isolation or at early stages of disease. Clinical trials have resulted in recommendations based instead on overall "diet effect," especially in IRIS stages 3 and 4.

The following are prioritized nutritional goals for cats diagnosed with early CKD:

- Promote and increase water intake, transitioning to all or part canned food if necessary.
- Make diet changes gradually to increase acceptance.
- Meet individual calorie needs to maintain healthy, stable weight.
- Select a product that provides high-quality protein to meet the cat's needs (approximately 5 g/kg body weight)⁴ yet avoid excessive levels.
- Reduce dietary phosphorus.
- Ensure that more than 90% of calories consumed are from a therapeutic diet formulated to meet the cat's needs and that foods used for treats or medication administration don't exceed 10% of caloric intake, provide excess nutrients, or create nutrient imbalances.

TABLE 1 Assessing the Diet of the CKD Cat

When conducting a nutritional assessment, it is important to gain a comprehensive understanding of everything the cat is eating daily, while also analyzing the nutritional profile of the diet.

PATIENT: Lily, 12-year-old spayed female domestic short-haired cat with a BCS of 5/9, stable body weight of 4 kg, and IRIS stage 2

FOOD NAME	FORM	AMOUNT PER FEEDING	MEALS OR TIMES FED PER DAY	DURATION FED	KCAL/DAY	PROTEIN/PHOSPHORUS LEVEL
Purina True Nature Adult 45% Protein Formula Natural Trout & Rice*	Dry	1/4 cup 450 kcal/cup	2	2 y	225 kcal/d	29 g protein/d Protein 12.89 g/100 kcal Phosphorus 367 mg/100 kcal
Purina Pro Plan Adult Tuna Entrée in sauce*	Wet	1/2 can 68 kcal/can	1	3 y	34 kcal/d	5.6 g protein/d Protein 16.7 g protein/100 kcal Phosphorus 293 mg/100 kcal
TREATS AND SUPPLEMENTS (INCLUDE FOODS USED TO ADMINISTER MEDICATIONS)						
Purina Pro Plan Focus Hairball Remedy Chews*	Dry	3 pieces (3 kcal/each)	1	3 years	9 kcal total	Unknown
Total Intake					268 kcal/d	Protein 34.6 g/d High phosphorus intake
Assessment 268 kcal meets Lily's daily calorie needs and exceeds her daily protein and phosphorus requirements						

*Nutrient values from Proplan Veterinary Diet 2018 Product Guide.

The Obesity Paradox: A Cushion Against Morality?

Obesity can be a complex issue to manage in cats with early CKD. On the one hand, obesity contributes to such conditions as osteoarthritis, diabetes, and urinary tract disease. On the other hand, excessive weight loss in feline patients with CKD can lower survival rate.¹⁰

Given high rates of both obesity and CKD in cats, it is inevitable that clinicians must weigh the relative risks and benefits of a weight reduction program in certain patients. The following steps are recommended:

- Perform a BCS on every patient at every visit and review the diet history. This reveals trends over time, both before and after CKD diagnosis.
- If the patient is 30% or more above ideal body weight, institute a judicious weight-loss program. If the patient is only mildly overweight (e.g., 6 or 6.5 on a 9-point BCS scale), feeding for stability vs. weight loss is preferable.
- When instituting a weight-loss program, restrict calories but do not restrict protein to avoid loss of lean muscle mass. Switching to a protein-restricted, energy-dense diet in the early stages of CKD is especially problematic because it can lead to concurrent body fat gain/muscle loss.

Once a nutritional recommendation is made, the patient should be monitored, with feeding recommendations adjusted as needed (**TABLE 2**).

Among nutritional recommendations, the most controversial may be that for protein. Historically, veterinarians were taught to reduce dietary protein upon diagnosing CKD, but that long-held assumption is changing. Without evidence that dietary protein reduction slows progression, the goal should be to feed a level of protein that meets the cat's needs while minimizing phosphorus. Dietary management alone will not prevent or reverse sarcopenia or cachexia, but calorie and/or protein deficiencies will certainly worsen it.⁵ Weight loss in cats with CKD is associated with a lower survival rate,¹⁰ which supports the importance of assuring adequate calories and protein intake in addition to phosphorus restriction. The introduction of newer therapeutic diets allows for customization of dietary recommendations for early- and late-stage CKD patients.

TABLE 2 Nutrient Modifications of Therapeutic Renal Diets for Cats With CKD

NUTRIENT	RECOMMENDATION	RATIONALE
Phosphorus	Restrict in all stages of CKD; typical range of phosphorus restriction is 80–135 mg/100 kcal	Phosphorus promotes progressive damage to the kidney. Failure to excrete excess phosphorus leads to release of parathyroid hormone and secondary renal hyperparathyroidism
Protein	<ul style="list-style-type: none"> ■ Early stages: Avoid excess levels but may not restrict (provide ~5.4 g protein/kg body weight/day) ■ Late stages: As disease progresses, reduce protein to minimize signs of uremia ■ Feed high-quality protein in all stages of disease 	<ul style="list-style-type: none"> ■ Feed moderate amounts of high-quality and highly digestible protein to prevent protein deficiency and help maintain lean muscle mass in early stages of CKD; geriatric cats require more protein than younger animals because of higher protein turnover⁵ ■ Later in the disease process, reducing protein minimizes production of filtered nitrogenous waste products ■ Regardless of levels, high-quality protein (highly digestible and complete) meets protein requirements and minimizes loss of lean body mass
Potassium	Increase levels of dietary potassium, particularly in late stages	<ul style="list-style-type: none"> ■ Hypokalemia is a common feature of cats with CKD, particularly in late stages ■ Low potassium can cause cats to feel unwell, but its effects on progression are unclear^{6,7}
Sodium	Control levels to avoid excess	Avoiding excesses is advised, but there is no evidence that restriction is necessary
Omega-3 fatty acids	Increase levels in all stages of CKD	Omega-3 fatty acids can increase renal blood flow, minimize hypoxic damage to tubulointerstitium, ⁸ and possibly reduce inflammatory mediators
Antioxidants	Increase levels in all stages of CKD	Antioxidants reduce hypoxia and oxidant damage associated with CKD ⁹
Water-soluble vitamins	Increase levels in all stages of CKD	Supplementation of water-soluble B vitamins can help compensate for levels depleted because of CKD-related polyuria

ADVANCED CKD: WHEN FEEDING NEEDS AN ASSIST

Assuring hydration and food intake is one of the most important components of nutritional management of cats with CKD. The goal when recommending a specific food and dose is to maintain stable, healthy body weight. Monitoring kidney function, hydration, body weight, BCS, and MCS is key to catching any decline quickly. If cats are unable to maintain weight on their own, intervention is essential.

Appetite Stimulants

If the cat's intake has waned, the first approach is to minimize nausea and/or increase the palatability of the diet. If substituting food flavors, textures, or serving temperatures does not improve intake, an antiemetic or appetite stimulant can be considered. Mirtazapine has been proven to significantly increase appetite, reduce vomiting, and promote weight gain in cats with CKD¹¹ and can be administered orally or as a transdermal ointment.

Assisted Feeding

If an appetite stimulant does not yield the desired results of intake equal to the daily caloric

requirement, then nutritional support by a long-term feeding tube should be considered. Either an esophagostomy tube or gastrostomy tube feeding is a very effective and a convenient way to provide food, water and liquid medications to cats with CKD.¹² This can also eliminate the need for administering subcutaneous fluids, which contain sodium.

CONCLUSION

Nutritional management of cats with CKD can positively affect the course of disease as well as quality of life for patients. With early diagnosis, veterinarians have the opportunity to intervene nutritionally throughout the disease process, basing their recommendations on the individual and changing needs of the whole cat, not just its kidneys. By recommending a diet that meets the individual patient's needs and supports stable body weight while minimizing the risks of disease progression, the veterinarian can make a significant difference in the lives of the patient and owner. **TVP**

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Upon receiving a BS and DVM from Michigan State University, Dr. Churchill completed a small animal internship in medicine and surgery at the University of Georgia, followed by combined residencies and a PhD program in small animal internal medicine and clinical nutrition at University of Minnesota. Her graduate work was capped with the development of a small animal clinical nutrition service at the UMN Veterinary Medical Center. Five years later, she developed a model to make it financially self-sustaining.

She is passionate about all aspects of small animal clinical nutrition, including maintaining wellness and preventive care, obesity prevention and treatment, the nutrition needs of geriatric patients, nutritional management of kidney diseases, and critical care nutrition. She served on the task force to develop the AAHA guidelines for weight management. She serves as president-elect of the Pet Nutrition Alliance (PNA) and on the educational tools committee of PNA working to develop a "go-to" website for credible nutritional information for veterinary practice teams and consumers. Dr. Churchill also serves on the Board of the Association for Pet Obesity Prevention.

